Statement of Basis

Title V Air Quality Operating Permit Renewal

Wharf Resources

Lead, South Dakota

South Dakota Department of Environment and Natural Resources

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1.0 Background

On March 6, 2007, the Department of Environment and Natural Resources (DENR) issued Title V air quality operating permit #28.1155-09 to Wharf Resources (Wharf) for its open pit gold mining operation near Lead, South Dakota.

On November 14, 2008, DENR received a proposal from Wharf for the addition of a "Mercury Retort Furnace". The furnace was used briefly by Wharf in the late 1990's. The furnace has the capacity to process 1.75 cubic feet of process material, which in this case is sludge, with a cycle time of approximately 22 hours. The furnace has a maximum design heat input rate of less than 0.1 million Btus per hour and is fired with natural gas. The furnace is used to vaporize the mercury in the sludge. A vacuum pump is used to draw the vapors in the exhaust gas and pass the exhaust through a condensing unit that is cooled with water. The liquid mercury is collected in a trap and the cooled air is filtered through a scrubber that contains iodized carbon before it is discharged out a stack. The furnace was determined to be an insignificant activity.

The permit was modified on November 19, 2009 to allow Wharf to operate the crushing and screening operations described as Unit #5 in an enclosed building without venting the particulate emissions into a baghouse.

Wharf submitted an application to renew its permit which was considered complete on December 8, 2011.

The facility mines ore and processes it through rock crushers to attain a desirable size for heap leach pads to extract gold from the ore. A sludge material containing the gold is extracted and processed in a retort and furnace to produce purified gold buttons. The Standard Industrial Classification code for this facility is 1041.

1.1 Existing Equipment

Table 1-1 provides a list of the units presently permitted which was taken from the current Title V air quality operating permit modified on November 19, 2009.

Table 1-1 – Description of Permitted Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Control Device
#5	1992 Tabor Machine Company, Model TI-140-M2, tertiary screen #1 (serial #3067)	800 tons per hour	Operated inside a building equipped with a 1996 C&W baghouse[1]
	1988 Nordberg, Model Omnicone 1560, tertiary crusher #1 (serial #255)	460 tons per hour	
	1988 Tabor Machine Company, Model TI-140-M2, tertiary screen #2 (serial #2940)	235 tons per hour	
	1988 Nordberg, Model Omnicone 1560, tertiary crusher #2 (serial #254)	480 tons per hour	
	1988 Tabor Machine Company, Model TI-140-	235 tons per hour	

Unit	Description	Maximum Operating Rate	Control Device
	M2, tertiary screen #3 (serial #2941)		
	1985 Nordberg, Model Omnicone 1560, tertiary crusher #3 (serial #1560-142-M)	480 tons per hour	
	1988 Tabor Machine Company, Model TI-140-M2, tertiary screen #4 (serial #2942)	235 tons per hour	
	1988 Nordberg, Model Omnicone 1560, tertiary crusher #4 (serial #256)	480 tons per hour	
#7	1991 Kewanee Manufacturing Company, Model #L3SW250, natural gas or propane fired steam boiler.	10.5 million Btus per hour	Not applicable

[1] – The baghouse does not operate under certain moisture and temperature conditions. During these conditions, the emissions are emitted inside the building.

Table 1-2 provides a list of the units that are covered by the current Title V air quality operating permit modified on November 19, 2009, as fugitive emission sources and are not included as permitted units in Table 1-1 of the current permit.

Table 1-2 – Description of Regulated Fugitive Emissions

Unit	Description	Maximum Operating Rate	Control Device
#1	1996 Tabor Machine Company, Model TI-140-M2, primary scalper (serial #2939)	1,200 tons per hour	Not applicable
#2	1997 Nordberg, Model C140-B, primary crusher (serial #C1400219-SER)	780 tons per hour	Water fogger
#3	1999 Deister Machine Company, Model BHM-2820, secondary screen (serial #819900)	1,000 tons per hour	Spray bars
#4	1999 Nordberg, Model HP 500, secondary crusher (serial #HP 500 173)	700 tons per hour	Spray bars

Wharf operates several units that are considered insignificant activities and exempt from permitting. Table 1-3 identifies the units that are considered insignificant activities and the Administrative Rules of South Dakota (ARSD) that identifies why the unit is considered an insignificant activity.

Table 1-3 – Insignificant Activities

Description	Maximum Input	ARSD Citation [1,2,3]
1988 Thermosteam Strip natural gas fired boiler, Model #FG60 (Plant Boiler #1)	2.5 MMBtus per hour	74:36:05:04.01(4)
1997 Bryan natural gas fired boiler, Model #RV350 (Bio-Denitrification Plant #1, Boiler #1)	3.5 MMBtus per hour	74:36:05:04.01(4)

Description	Maximum Input	ARSD Citation [1,2,3]
1998 Bryan natural gas fired boiler, Model #RV350 (Bio-Denitrification Plant #1, Boiler #2)	3.5 MMBtus per hour	74:36:05:04.01(4)
2005 Superior Mohawk natural gas fired boiler, Model #4-5-204-5150-GP (Plant Boiler #2)	2.52 MMBtus per hour	74:36:05:04.01(4)
1989 McEnglevan Speedy Melt natural gas fired melt furnace, Model #T-200	1.0 MMBtus per hour	74:36:05:04.01(4)
1988 Boldin Allis natural gas fired reactivation kiln	0.6 MMBtus per hour	74:36:05:04.01(4)
1998 Karns Machine enclosed lime silo	0.42 tons per hour	74:36:05:04.01(7)
1997 custom equipment mercury retort furnace fired with natural gas	0.1 MMBtus per hour	74:36:05:04.01(4) and (8)

[1] - ARSD 74:36:05:04.01(4) states that a device or apparatus that has a heat input capability of not more than 3,500,000 Btus per hour is exempt from inclusion in a Part 70 operating permit.

[2] – ARSD 74:36:05:04.01(7) states that a unit that has the potential to emit two tons or less per year of any criteria pollutant before the application of control equipment is exempt from inclusion in a Part 70 operating permit.

[3] – ARSD 74:36:05:04.01(8) states that a unit that has the potential to emit two tons or less per year of any hazardous air pollutant is exempt from inclusion in a Part 70 operating permit.

1.2 Proposed Changes

The December 2011 application contains several sources that are either new to the facility or have not been previously reviewed. These units will be reviewed as part of this Statement of Basis:

1. 1989 Cat Generator rated at 1,750 kilowatts (2,344 horsepower) combusting distillate fuel. The rated capacity is based on a search of the model number and not the 12 kilowatts listed on the generator form;
2. 1988 Euclid Generator rated at 660 kilowatts (884 horsepower) combusting distillate fuel;
3. 2010 Electrowinning Cell #1;
4. 2010 Electrowinning Cell #2; and
5. 2010 Electrowinning Cell #3.

Electrowinning is used to remove metallic ions from concentrated rinse water, spent process solutions, and ion exchange reagents. An Electrowinning unit consists of a rectifier and a reaction chamber that houses anodes and cathodes. In the simplest design, a set of cathodes and anodes are set in the reaction chamber containing the electrolyte. When the unit is energized, metal ions are reduced onto the cathode. The rate at which metal can be recovered (i.e., plated onto the cathode) from solutions depends on several factors, including the concentration of metal in the electrolyte, the size of the unit in terms of current and cathode area, and the species of metal being recovered.

An April 12, 2012, Wharf submitted a request to install an additional screening plant at the facility. The additional screening provided by the plant will be used to improve the efficiency of

the plant by screening off finer material prior to entering the secondary crushing equipment. This will not change the throughput of the crushing facility nor will the crushed tons per hour be increased.

DENR will review the proposed addition of the screening plant to determine if there are any applicable standards that apply to it.

2.0 New Source Performance Standards

DENR reviewed the New Source Performance Standards listed in 40 CFR Part 60 to determine if any of the federal New Source Performance Standards are applicable to this facility. The following may be applicable.

2.1 Standards for Rock Crushing and Screening Equipment

The provisions under 40 CFR Part 60, Subpart LL are applicable to the following metallic mineral processing plants: each crusher and screen in open-pit mines; each crusher, screen, bucket elevator, conveyor belt transfer point, thermal dryer, product packaging station, storage bin, enclosed storage area, truck loading station, truck unloading station, railcar loading station, and railcar unloading station at the mill or concentrator with the following exceptions. All facilities located in underground mines are exempted from the provisions of this subpart. At uranium ore processing plants, all facilities subsequent to and including the beneficiation of uranium ore are exempted from the provisions of this subpart.

Wharf is considered a metallic mineral processing facility and subject to the requirements of 40 CFR Part 60 Subpart LL. *Metallic mineral processing plant* means any combination of equipment that produces metallic mineral concentrates from ore. Metallic mineral processing commences with the mining of ore and includes all operations either up to and including the loading of wet or dry concentrates or solutions of metallic minerals for transfer to facilities at non-adjacent locations that will subsequently process metallic concentrates into purified metals (or other products), or up to and including all material transfer and storage operations that precede the operations that produce refined metals (or other products) from metallic mineral concentrates at facilities adjacent to the metallic mineral processing plant.
Metallic mineral concentrate means a material containing metallic compounds in concentrations higher than naturally occurring in ore but requiring additional processing if pure metal is to be isolated. A metallic mineral concentrate contains at least one of the following metals in any of its oxidation states and at a concentration that contributes to the concentrate's commercial value: Aluminum, copper, gold, iron, lead, molybdenum, silver, titanium, tungsten, uranium, zinc, and zirconium. This definition shall not be construed as requiring that material containing metallic compounds be refined to a pure metal in order for the material to be considered a metallic mineral concentrate to be covered by the standards.
This subpart sets different emission limits for similar equipment based on whether the emissions are *stack emissions* or *process fugitive emissions*.

The definitions of terms used in this subpart are in § 60.381 and include the following:

1. *Process fugitive emissions* means particulate matter emissions from an affected facility that are not collected by a capture system; and
2. *Stack emissions* means the particulate matter captured and released to the atmosphere through a stack, chimney, or flue.

Under the current operating scenario (emissions controlled by a baghouse equipped enclosure), Unit #5 emits *stack emissions* – the other crushing and screening operations are considered to emit fugitive emissions. Under the proposed operating scenario (emissions controlled by the enclosure), Unit #5 will emit *process fugitive emissions* from any openings in the building and is the only unit subject to permitting. However, the other crushing and screening operations are still subject to opacity standards.

Unit #5 is required under the NSPS to 0.05 grams per dry standard cubic meter (g/dscm) and 7 percent opacity. Fugitive emissions under the proposed operating scenario will be limited to 10 percent opacity. These emission limits will be added to the permit along with any applicable testing, monitoring, and recordkeeping or reporting requirements.

2.2 Standards for Nonmetallic Mineral Processing Plants

The standards of performance for nonmetallic mineral processing plants under 40 CFR Part 60 Subpart OOO are applicable to following:

1. The provisions of this subpart are applicable to each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station; and
2. Commences construction, reconstruction, or modification after August 31, 1983.

A nonmetallic mineral processing plant means "any combination of equipment that is used to crush or grind any nonmetallic mineral…" Nonmetallic mineral means "any of the following minerals or any mixture of which the majority is any of the following minerals: (a) Crushed and broken stone, including limestone, dolomite, granite, traprock, sandstone…" Although dolomite and sandstone are listed as nonmetallic minerals, the dolomite and sandstone processed by Wharf is considered a metallic mineral concentrate because it contains gold. Therefore, this Subpart is not applicable.

2.3 Standards Applicable to Boilers

There are three New Source Performance Standards for fossil fuel-fired steam generators. The three standards are applicable to the following steam generators:

1. 40 CFR Part 60, Subpart D: applicable to a steam generator with a maximum operating rate of 250 million Btus per hour or more and commenced construction after August 17, 1971;

2. 40 CFR Part 60, Subpart Db: applicable to a steam generator with a maximum operating rate of 100 million Btus per hour or more and commenced construction after June 19, 1984; and
3. 40 CFR Part 60, Subpart Dc: applicable to a steam generator with a minimum design heat input capacity equal to or greater than 10 million Btus per hour but less than or equal to 100 million Btus per hour and commenced construction after June 9, 1989.

Unit #7 falls under 40 CFR Part 60, Subpart Dc because it has a maximum heat input capacity of 10.5 million Btus per hour and was constructed in 1991. This Subpart contains limits and requirements for those units that burn distillate or residual oil, coal, or wood. Wharf fires the boiler with natural gas or propane. There are no limits or requirements for natural gas or propane; therefore, Wharf will not be subject to additional conditions pertaining to this Subpart as long as natural gas or propane are the only fuel sources. Wharf has already submitted its initial notification for Unit #7. Therefore, the recordkeeping and reporting requirements for the initial notification will not be included in the renewed permit.

Wharf operates the following natural gas or propane fired boilers:

1. 1988 Thermosteam Strip natural gas fired boiler rated at 2.5 million Btus per hour;
2. 1997 Bio De-nitrification Plant #1, Boiler #1 fired with natural gas or propane and rated at 3.5 million Btus per hour;
3. 1998 Bio De-nitrification Plant #1, Boiler #2 fired with natural gas and propane and rated at 3.5 million Btus per hour;
4. 1998 Bryan natural gas fired boiler rated at 3.5 million Btus per hour; and
5. 2005 Superior Mohawk natural gas fired boiler rated at 2.0 million Btus per hour.

The heat input for these boilers is less than any of the Subparts. Therefore, these units are not subject to these subparts.

2.4 Standards for Generators

The provisions of 40 CFR Part 60, Subpart IIII are applicable to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) that meet one of the following:

1. Manufacturers of stationary CI ICE with a displacement of less than 30 liters per cylinder where the model year is 2007 or later for engines that are not fire pump engines or model year 2008 or later for engines that are fire pump engines;
2. Owners or operators of stationary CI ICE that commence construction after July 11, 2005 where the CI ICE is manufactured after April 1, 2006 and is not a fire pump engine or manufactured as a certified National Fire Protection Association fire pump engine after July 1, 2006; or
3. Owners or operators of stationary CI ICE that modified or reconstructed their stationary CI ICE after July 11, 2005.

Wharf operates a 1989 Caterpillar, Model 710, 12 kilowatt (16.1 horsepower) generator and a Euclid Marathon Electric Model #573 660 kilowatt (884 horsepower) generator. Both generators combust distillate fuel and were manufactured prior to 2005 – therefore, this subpart is not applicable to either generator.

2.5 Other Applicable New Source Performance Standards

DENR reviewed the other New Source Performance Standards and determined there are no other standards applicable to Wharf.

3.0 New Source Review

In accordance with ARSD 74:36:10:01, the new source review regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. This facility is located near Lead, South Dakota, which is in attainment or unclassifiable for all the criteria air pollutants regulated under the Clean Air Act. Therefore, Wharf is not subject to new source review.

4.0 Prevention of Significant Deterioration

A prevention of significant deterioration (PSD) review applies to new major stationary sources and major modifications to existing major stationary sources in areas designated as attainment under Section 107 of the Clean Air Act for any regulated air pollutant. The following is a list of regulated air pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate with a diameter less than or equal to 10 microns (PM10);
3. Particulate with a diameter less than or equal to 2.5 microns (PM2.5);
4. Sulfur dioxide (SO_2);
5. Nitrogen oxides (NOx);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOCs);
8. Lead;
9. Fluorides
10. Sulfuric acid mist;
11. Hydrogen sulfide;
12. Reduced sulfur compounds;
13. Total reduced sulfur; and
14. Greenhouse gases (carbon dioxide, methane, nitrous oxide, etc.).

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the federal Clean Air Act, the major source threshold is 100 tons per year of any regulated air pollutant, except for greenhouse gases. The major source threshold for all other sources is 250

tons per year of any regulated air pollutant, except for greenhouse gases. Wharf is not considered one of the 28 listed source categories for PSD regulations and the major source threshold is 250 tons per year, except for greenhouse gases.

According to the Clean Air Act, once a pollutant is regulated under any part of the Act, (as was the case with greenhouse gas emissions after the motor vehicle regulations were finalized in March 2010) major new sources or major modifications are subject to the PSD program and Title V air quality operating permit program. Under the Clean Air Act, PSD and Title V air quality operating permits are required for all sources that emit a regulated air pollutant above 100 or 250 tons per year, depending on the source. This threshold, if applied to greenhouse gases, would greatly increase the number of facilities requiring a PSD review or Title V air quality operating permit. Based on administrative necessity, EPA increased these thresholds through the "Tailoring Rule."

On May 13, 2010, EPA issued the final version of the "Tailoring Rule" for greenhouse gas emissions. The major source threshold for greenhouse gases is listed below:

1. New PSD source because of a criteria air pollutant, the major source threshold for greenhouse gases is 75,000 tons per year of carbon dioxide equivalent or more;
2. New PSD source if greenhouse gas emissions are 100,000 tons per year of carbon dioxide equivalent or more;
3. For an existing PSD source because of a criteria air pollutant, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more;
4. For an existing non-PSD source that has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more; and
5. In addition to subsection (2) and (4), a specific greenhouse gas, without calculating the carbon dioxide equivalent, also needs to emit greater than 100 or 250 tons per year, whichever is applicable, to be regulated.

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturer data, material balances, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Volume 1, Fifth Edition) document, the applicant's application, or other methods to determine potential air emissions.

4.1 Potential Criteria Air Pollutant Emissions – Boilers

DENR used EPA's AP-42, Chapter 1.4-1, 7/98 document to determine air emissions from Unit #7 and the other boilers operated by Wharf. EPA's AP-42 document classifies boilers according to its gross heat rate. For natural gas, small industrial boilers are considered to be those with a gross heat rate ranging from 0.3 to 100 million Btus per hour. For propane, industrial boilers have a gross heat rate ranging from 10 to 100 million Btus per hour. Unit #7 is considered a small industrial boiler and the emission factors for small industrial boilers are listed in Table 4-1.

Table 4-1 – Emission Factors for Unit #7

Air Pollutant	Natural Gas	Propane
Total suspended particulate	7.6 pounds/million cubic feet	0.7 pounds/1,000 gallons
PM10 [1]	7.6 pounds/million cubic feet	0.7 pounds/1,000 gallons
PM2.5 [2]	7.6 pounds/million cubic feet	0.7 pounds/1,000 gallons
Sulfur dioxide	0.6 pounds/million cubic feet	0.02 pounds/1,000 gallons [3]
Nitrogen oxide	100 pounds/million cubic feet	13 pounds/1,000 gallons
Carbon monoxide	84 pounds/million cubic feet	7.5 pounds/1,000 gallons
Volatile organic compounds	5.5 pounds/million cubic feet	0.2 pounds/1,000 gallons

[1] – PM10 means particulate matter 10 microns in diameter or less;
[2] – PM2.5 means particulate matter 2.5 microns in diameter or less; and
[3] – The sulfur content of propane is assumed to be 0.2 grains per 100 cubic feet.

Equation 4-1 is used to calculate air emissions from the boilers while burning natural gas. DENR assumed a natural gas heat input of 1,020 Btus per cubic foot.

Equation 4-1 – Boiler (Natural Gas) Potential Emissions

$$E = Heat\ Input \frac{MMBtus}{hour} \div 1{,}020 \frac{Btus}{cf} \times 8{,}760 \frac{hours}{year} \times Emission\ Factor \frac{lbs}{MMcf} \div 2{,}000 \frac{lbs}{ton}$$

Equation 4-2 is used to calculate air emissions from the boilers while burning propane. DENR assumed a propane heat input of 94,000 Btus per gallon.

Equation 4-2 – Boiler (Propane) Potential Emissions

$$E = Heat\ Input \frac{MMBtus}{hour} \div 0.094 \frac{MMBtus}{gallon} \times 8{,}760 \frac{hours}{year} \times Emission\ Factor \frac{lbs}{1{,}000\ gallons} \div 2{,}000 \frac{lbs}{ton}$$

The results of Equation 4-2 and 4-3, using the emission factors from Table 4-1, may be viewed in Table 4-2. As previously noted only one of the boilers, Unit #7, has a maximum heat input greater than 3.5 million Btus per hour. Fuel burning units with a heat input of less than 3.5 million Btus per hour are exempt from permitting. DENR included the emissions from the exempted natural gas fired units in its review but has combined all the units. DENR will only present the fuel that produced the greatest emissions for each pollutant in the summary of potential emissions for the facility.

Table 4-2 – Potential Criteria Air Pollutant Emissions from Unit #7 (tons per year)

	TSP	PM10	PM2.5	SO_2	NOx	CO	VOCs
Unit #7							
Natural Gas	0.3	0.3	0.3	0.03	4.5	3.8	0.3
Propane	0.3	0.3	0.3	0.01	6.4	3.7	0.1
Insignificant Units (14 MMBtu)							
Natural Gas	0.5	0.5	0.5	0.04	6.0	5.0	0.3

4.2 Potential Criteria Air Pollutants – Generators

DENR used EPA's AP-42 Chapter 3.4, 10/96 document for the 1,750 kilowatt and 660 kilowatt generators, respectively, to determine air emissions from the two diesel fueled generators and are displayed in Table 4-3.

Table 4-3 – Emission Factors for Generators

Air Pollutant	Generator
Total suspended particulate	0.0697 pounds per MMBtus
PM10 [1]	0.0573 pounds per MMBtus
PM2.5 [2]	0.0556 pounds per MMBtus
Sulfur dioxide [3]	0.05 pounds per MMBtus
Nitrogen oxide	3.2 pounds per MMBtus
Carbon monoxide	0.85 pounds per MMBtus
Volatile organic compounds	0.0819 pounds per MMBtus

[1] – PM10 means particulate matter 10 microns in diameter or less;
[2] – PM2.5 means particulate matter 2.5 microns in diameter or less; and
[3] – The sulfur content of the diesel fuel is assumed to be 0.05 percent by weight

The 1989 Caterpillar 3516 generator has a heat output of 1,750 kilowatts and the 1988 Euclid #573 has a heat output of 660 kilowatts. In order to calculate potential emissions using the AP-42 emission factors, the heat input capacity of the unit was calculated based on its capacity in kilowatts listed in the application. Generators typically have an operational efficiency of 35%. Equation 4-3 converts the maximum design operating rate from kilowatts (output) to million Btus per hour (heat input) using a conversion factor of 3,413 Btus per hour-kilowatt.

Equation 4-3 – Converting Heat Output to Heat Input

$$Maximum\ Capacity_{heat\ input}\left[\frac{MMBtus}{hour}\right]=\left(\frac{heat\ output}{0.35}[kW]\times 3{,}413\left[\frac{Btus}{hr-kW}\right]\times\frac{MMBtus}{10^{6}\ Btus}\right)$$

The maximum heat input for the 1,750 kilowatt generator is 17.1 million Btus per hour and the 660 kilowatt generator is 6.4 million Btus per hour.

Equation 4-4, the heat input, and the emission factors in Table 4-3 were used to calculate the potential emissions from the generators. Wharf identified the generators as emergency generators; therefore, DENR used 500 hours per year of operation to determine potential emissions.

Equation 4-4 – Potential Emissions for Generator

$$Potential\ Emissions\left[\frac{tons}{year}\right]=\left(\frac{Emission\ Factor\left[\frac{pounds}{MMBtu}\right]\times 500\left[\frac{hours}{year}\right]\times Heat\ Input\left[\frac{MMBtus}{hour}\right]}{2{,}000\left[\frac{pounds}{tons}\right]}\right)$$

The results of the potential emissions for the generators are displayed in Table 4-4.

Table 4-4 – Potential Criteria Air Pollutant Emissions from Generators (tons per year)

Unit	TSP	PM10	PM2.5	SO_2	NOx	CO	VOCs
1989 Cat Generator [1]	0.3	0.3	0.2	0.2	13.7	3.6	0.4
1988 Euclid Generator [1]	0.1	0.1	0.1	0.1	5.1	1.4	0.1
Total	**0**	**0**	**0**	**0**	**19**	**5**	**1**

[1] – Potential emissions from generators are based on operating 500 hours per year.

4.3 Potential to Emit – Tertiary Crusher

As previously noted in Section 2.1, Unit #5 is the only source that emits out of a stack. Wharf's primary and secondary crushers and screens are considered fugitive emission sources. Wharf conducted stack testing on Unit #5 on July 6, 2007 and determined the average emission rate(s) over three one-hour tests:

1. 0.0056 grams per dry standard cubic meter;
2. 0.09 pounds per hour; and
3. 1.26 E-4 pounds per ton.

The uncontrolled emission rate for Unit #5 is derived from AP-42 11.19.2 – *Crushed Stone Processing and Pulverized Mineral Processing*, August 2004. AP-42 11.19.2 assumes that in crushing and screening operations, limestone with a moisture content of less than 1.5 % is uncontrolled, while a moisture content of greater than 1.5 % indicates controlled. Wharf's application shows the ore has a moisture content of 4.67 % or greater; therefore, DENR used emission factors corresponding to limestone with a moisture content greater than 1.5 % (controlled). The following emission factors were used for tertiary crushing and screening:

1. 0.0012 pounds per ton (tertiary crushing); and
2. 0.0022 pounds per ton (screening).

Because the crusher system is enclosed within a building, the building itself reduces emissions. Therefore, DENR will consider the enclosed building when calculating the potential uncontrolled emissions - 90% control is attributed to the building. Table 4-5 summarizes the emissions factors for Unit #5.

Table 4-5 – Operating Scenario Emission Factors

Emission Rate	Enclosed [1]	Enclosed with Baghouse [2]
Gram per dry standard cubic meter	-	0.0056
Pounds per ton crushed	0.00012 or 0.00022	0.000126
Pounds per hour	-	0.09

[1] – Emission rates are calculated by multiplying the uncontrolled emission rate by 0.1. The 0.1 takes into account the 90 percent efficiency of the building (1-0.9).

[2] – Emission rates based on the July 2007 stack tests and operating at approximately 700 pounds per ton rate.

Table 4-6 summarizes Unit #5's potential emissions based on the emission rates listed in Table 4-5.

Table 4-6 – Unit #5 Potential Particulate Emissions

Unit	Enclosed [1]	Baghouse [2]
#5	2.4 tons per year	1.9 tons per year

[1] – Potential emissions calculated by the following equation – ((0.00012 pounds per ton x 1900 tons per hour) + (0.00022 pounds per ton x 1505 tons per hour)) x (8760 hours per year) / (2000 pounds per ton); and

[2] - Potential emissions calculated by the following equation – (0.000126 pounds per ton x 3405 tons per hour) x (8760 hours per year) / (2000 pounds per ton)

DENR assumed the total suspended particulate, PM10, and PM2.5 emission rates are equivalent.

4.4 Lime Silo

AP-42, 11.12-2, 6/06, lists controlled and uncontrolled particulate emission factors for loading of cement silos. The following are the uncontrolled emission factors from AP-42. Wharf's lime silo is rated at 0.42 tons per hour.

1. TSP = 0.73 pounds per ton lime loaded; and
2. PM10 = 0.47 pounds per ton of lime loaded.

Equation 4-5 will be used to determine potential emissions from the lime silo. Table 4-7 provides a summary of potential emissions from the lime silo.

Equation 4-5 – Potential Emissions from Lime Silo

$$E = loading\ rate \frac{tons}{hour} \times 8{,}760 \frac{hours}{year} \times Emission\ Factor \frac{lbs}{ton} \div 2{,}000 \frac{lbs}{ton}$$

Table 4-7 – Potential Emissions from Lime Silo

Unit	TSP Emissions	PM10 Emissions
Lime Silo	1.3 tons per year	0.85 tons per year

4.5 Fugitive Emissions

Under 40 CFR § 52.21(b)(1)(iii), fugitive emissions of a stationary source shall not be included in determining for any of the purposes of this section whether it is a major stationary source, unless the source belongs to a certain category of stationary sources. Included in that category of stationary sources is any stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Clean Air Act. Wharf is subject to section 111 of the Clean Air Act and the requirements were promulgated after August 7, 1980. The fugitive

emissions required to be considered are restricted to those regulated under the applicable New Source Performance Standard.

In this case, the fugitive dust sources regulated are crushers and screens at the open pit mine and crushers, screens, bucket elevators, conveyor belt transfer points, thermal dryers, product packaging stations, storage bins, enclosed storage areas, truck loading station, truck unloading stations, railcar loading stations, and railcar unloading stations at a mill or concentrator. Wharf operates the crushing operation next to theprocessing operation, which is considered the heap leach area.

After discussions with Wharf, it was determined that the following fugitive dust sources were operated at the processing site:

1. Crushers and Screens
2. Conveyor belt transfer points – Five transfer points operated outside;
3. Truck unloading station – Trucks unload into the initial hopper; and
4. Storage area (hoppers) – Two hoppers operated outside.

4.5.1 Crusher and Screens

Wharf Resources mines metallic ore. The metallic ore mined at Wharf Resources' is predominantly composed of dolomite and sandstone. It has a similar structure to limestone; therefore, DENR reviewed the emissions factors from AP-42 11.19.2 – *Crushed Stone Processing and Pulverized Mineral Processing* to calculate particulate emissions. Because emission factors for primary and secondary crushing were not available in AP-42, 11.19.2, DENR reviewed other EPA documents to determine the correct emission factor for the primary crushing operations.

DENR was successful in finding a particulate matter 10 micron or less (PM10) emission factor for primary crushers for "stone quarrying" operations in "Uncontrolled Emission Factor Listing for Criteria Air Pollutants," Volume II: Chapter 14, June 2000.

1. Primary Crushing – 0.0007 pounds per ton

However, there was no emission factor for total suspended particulate matter. DENR decided to use Equations 4-6 and 4-7 to determine the total suspended particulate matter and PM2.5 emission factors.

Equation 4-6 – TSP Emission Factor

$$E_{TSP} = 0.0054_{Tertiary\,TSP\,Emission\,Factor} \times 0.0007_{PM10\,Emission\,Factor} \div 0.0024_{Tertiary\,PM10\,Emission\,Factor}$$

$E_{TSP} = 0.0016$

Equation 4-7 – PM2.5 Emission Factor

$$E_{TSP} = 0.00010_{Tertiary\ PM\ 2.5\ Emission\ Factor} \times 0.0007_{PM\ 10\ Emission\ Factor} \div 0.00054_{Tertiary\ PM\ 10\ Emission\ Factor}$$

$E_{TSP} = 0.00013$

AP-42 11.19.2 assumes that in crushing and screening operations, limestone with a moisture content of less than 1.5 % is uncontrolled, while a moisture content of greater than 1.5 % indicates controlled. Wharf's application shows the ore has a moisture content of 4.67 % or greater; therefore, DENR used emission factors corresponding to limestone with a moisture content greater than 1.5 % (controlled). In addition, Wharf uses water spray bars to maintain the fugitive emissions less than the New Source Performance Standard opacity requirements. DENR assumed the secondary crusher and screens would have similar emission factors as used for tertiary crushing (controlled) and screening (controlled):

1. TSP = 0.0012 pounds per ton (tertiary crushing);
2. PM10 = 0.00054 pounds per ton (tertiary crushing);
3. PM2.5 = 0.00010 pounds per ton (tertiary crushing);
4. TSP = 0.0022 pounds per ton (screening);
5. PM10 = 0.00074 pounds per ton (screening); and
6. PM2.5 = 0.000050 pounds per ton (screening).

Equation 4-8 will be used to determine potential emissions from the crushing and screening operations. Table 4-8 provides a summary of the potential emissions.

Equation 4-8 –Potential Emissions for crusher / screen

$$E = Maximum\ Capacity\ \frac{tons}{hour} \times 8{,}760\ \frac{hours}{year} \times Emission\ Factor\ \frac{lbs}{ton} \div 2{,}000\ \frac{lbs}{ton}$$

Table 4-8 Fugitive Emission for Crushing and Screening (tons per year)

Operation	TSP	PM-10	PM2.5
Primary Scalper	8.4	3.7	0.7
Primary Crusher	5.5	2.4	0.4
Secondary Screen	9.6	3.2	0.2
Secondary Crusher	3.7	1.7	0.3
New Screen	9.6	3.2	0.2

4.5.2 Loading, unloading and transfer points

Truck loading stations are defined as that portion of a metallic mineral processing plant where metallic minerals or metallic mineral concentrates are loaded by a conveying system into trucks. Wharf does not operate a truck loading station as defined in the New Source Performance Standard because the material from the conveyor belts is dumped on the ground.

The fugitive emission factors for the conveyor belt transfer points and truck unloading stations were derived from AP-42, Table 11.19.2-2, 8/04. Again, the controlled emission factor will be used because of the moisture content of the metallic mineral ore. There is no emission factor for total suspended particulate matter or particulate matter less than 2.5 microns for truck unloading.

DENR will assume the total suspended particulate matter to PM10 and PM2.5 to PM10 ratios for conveyor belt transfer points will be similar to the ratio for truck unloading. The calculations would be similar to equations 4-6 and 4-7.

The operations that are considered storage areas are the hopper that feeds the primary screen and the hopper that feeds material onto a conveyor just before the material enters the crusher building. The fugitive dust emissions from the hopper were derived from "Uncontrolled Emission Factor Listing for Criteria Air Pollutants," Volume II: Chapter 14, June 2000. The category that best fits the hopper is the "Miscellaneous operations: screen/convey/handling". There is no emission factor for total suspended particulate matter or particulate matter less than 2.5 microns the miscellaneous operation; therefore, DENR will assume the total suspended particulate matter to PM10 and PM2.5 to PM10 ratios for conveyor belt transfer points will be similar to the ratio the miscellaneous operation.
Table 4-8 provides a summary of the fugitive dust emission factors.

Table 4-8 – Fugitive Emission Factors (pounds per ton)

Operation	TSP	PM10	PM2.5
Conveyor belt transfer point	0.00014	4.6×10^{-5}	1.3×10^{-5}
Truck unloading (fragmented)	4.9×10^{-5}	1.6×10^{-5}	4.5×10^{-6}
Storage bins	0.00426	0.0014	0.0004

Equation 4-9 was used to determine potential uncontrolled emissions from the fugitive sources. The maximum capacity of the truck unloading, storage bins, and conveyor transfer points is based on the maximum capacity of the entire system (1,200 tons per hour). In the case of the storage bins, the result is multiplied by two since there are two storage bins. The fugitive emissions from the conveyor belts are based on the number of transfer points. The result for the conveyor belt transfer points is multiplied by five, since there are five conveyor belts. The results of Equation 4-9, using the emission factors from Table 4-8, may be viewed in Table 4-9.

Equation 4-9 – Potential Emissions for loading, unloading, and storage

$$E = 1{,}200 \frac{tons}{hour} \times 8{,}760 \frac{hours}{year} \times Emission\ Factor \frac{lbs}{ton} \div 2{,}000 \frac{lbs}{ton}$$

Table 4-9 - Fugitive Emission for loading, unloading, and storage (tons per year)

Operation	TSP	PM-10	PM2.5
Conveyor belt transfer point	3.7	1.2	0.3
Truck unloading (fragmented)	0.3	0.1	0.0
Storage bins	44.8	14.7	4.2

4.6 Potential Greenhouse Gas Emissions

Wharf is considered an existing non-PSD source. The next step is to determine if Wharf has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more. There are six regulated greenhouse gases which are listed below:

1. Carbon dioxide;
2. Nitrous oxide;
3. Methane;
4. Hydrofluorocarbons;
5. Perfluorocarbons; and
6. Sulfur hexafluoride.

The greenhouse gas emissions from the burning of natural gas, propane, and diesel are displayed in Table 4-10 and were derived from the same chapters in AP-42 as the criteria air pollutant emissions factors.

Table 4-10 – Emission Factors for Greenhouse Gases

Description	Carbon Dioxide	Nitrous Oxide	Methane
Unit #7 (natural gas)	120,000 lbs/MMcf	2.2 lbs/MMcf	2.3 lbs/MMcf
Unit #7 (propane)	12,500 lbs/1,000 gals	0.2 lbs/1,000 gals	0.9 lbs/1,000 gals
1989 Generator	164 lbs/MMBtus	-	-
1988 Generator	165 lbs/MMBtus	0.008 lbs/MMBtus	-
Other Boilers	120,000 lbs/MMcf	2.2 lbs/MMcf	2.3 lbs/MMcf

Equation 4-1 and 4-2 along with the emission factors in Table 4-10 for Unit #7 were used to calculate greenhouse gas emissions for natural gas and propane, respectively. The results were multiplied by 1, 310, and 21 for carbon dioxide, nitrous oxide, and methane, respectively, to convert the results to carbon dioxide equivalent. The emission factor that results in the greatest emissions are displayed in Table 4-10.

Equation 4-4 along with the emission factors in Table 4-10 were used to calculate greenhouse gas emissions from the generators. The result of were multiplied by 1, 310, and 21 for carbon dioxide, nitrous oxide, and methane, respectively, to convert the results to carbon dioxide equivalent. The results are displayed in Table 4-11.

The combined heat input of Wharf's insignificant activities is 14 million Btus per hour. Substituting the 14 million Btus per hour heat input in Equation 4-1 and using the emission factors in Table 4-9, greenhouse gas emissions were calculated for the other boilers. The result of were multiplied by 1, 310, and 21 for carbon dioxide, nitrous oxide, and methane, respectively, to convert the results to carbon dioxide equivalent. The results are displayed in Table 4-11.

Table 4-11 – Potential Greenhouse Gas Emissions

Description	Pollutant	Emissions	Carbon Dioxide Equivalent
Unit #7	CO_2	5,411 tons per year	5,411 tons per year
	N_2O	0.1 tons per year	31 tons per year
	CH_4	0.1 tons per year	2 tons per year
1989 Generator	CO_2	5 tons per year	5 tons per year
1988 Generator	CO_2	264 tons per year	264 tons per year
	N_2O	0 tons per year	0 tons per year
Other Units	CO_2	7,214 tons per year	7,214 tons per year
	N_2O	0.1 tons per year	31 tons per year
	CH_4	0.1 tons per year	2 tons per year
		Total	**12,960 tons per year**

4.7 Potential Emission Summary for Criteria Air Pollutants

The potential emissions from the fuel burning, crushing and gold processing operations are shown in Table 4-12 and 4-13.

Table 4-12 – Potential Air Emissions (tons per year)

Description	TSP	PM10	PM2.5	SO_2	NOx	CO	VOCs
Permitted Units							
Unit #5	2.4	2.4	2.4	-	-	-	-
Unit #7	0.3	0.3	0.3	0.03	6.4	3.8	0.3
1989 Generator [1]	0.3	0.3	0.2	0.2	13.7	3.6	0.4
1988 Generator [1]	0.1	0.1	0.1	0.1	5.1	1.4	0.1
Fugitive Sources							
Primary Scalper	8.4	3.7	0.7	-	-	-	-
Primary Crusher	5.5	2.4	0.4	-	-	-	-
Secondary Screen	9.6	3.2	0.2	-	-	-	-
Secondary Crusher	3.7	1.7	0.3	-	-	-	-
New Screen	9.6	3.2	0.2	-	-	-	-
Conveyor belt transfer point	3.7	1.2	0.3	-	-	-	-
Truck unloading (fragmented)	0.3	0.1	0.0	-	-	-	-
Storage bins	44.8	14.7	4.2	-	-	-	-
Insignificant Units							
Natural Gas Fired	0.5	0.5	0.5	0.04	6.0	5.0	0.3
Lime Silo	1.3	0.9	0.9	-	-	-	-
Total	**91**	**35**	**11**	**0**	**31**	**14**	**1**

[1] – Potential emissions from generators are based on operating 500 hours per year.

Wharfs' potential emissions of criteria air pollutants are less than the major source threshold under the PSD program. Wharf is considered an existing non-PSD source with the potential to emit less than 100,000 tons per year of carbon dioxide equivalent emissions. Therefore, Wharf is considered a minor source for criteria air pollutants and greenhouse gases under the PSD program.

5.0 National Emission Standards for Hazardous Air Pollutants

DENR reviewed 40 CFR Part 61 to determine the applicability to this facility to any of the subparts and determined the following may be applicable.

5.1 Subpart E—National Emission Standard for Mercury

The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge. Mercury ore is a mineral that is specifically mined for its mercury content.

Wharf operates three electrowinning cells, a melt furnance, and a reactivation kiln to recover gold from the ore and not specifically for mercury. Therefore, this subpart is not applicable.

5.2 Other NESHAP Standards

DENR reviewed the other national emission standards for hazardous air pollutants and determined there are no other standards applicable to Wharf.

6.0 Maximum Achievable Control Technology Standards

The federal Maximum Achievable Control Technology Standards are applicable to both major and area sources of hazardous air pollutants. A major source of hazardous air pollutants is defined as having the potential to emit 10 tons or more per year of a single hazardous air pollutant or 25 tons per year or more of a combination of hazardous air pollutants. An area source is a source that is not a major source of hazardous air pollutants.

6.1 Potential HAP Emissions

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

DENR used EPA's AP-42, Chapter 1.4-1, 7/98 document to determine air emissions from Unit #7. EPA's AP-42 document classifies boilers according to its gross heat rate. For natural gas, small industrial boilers are considered to be those with a gross heat rate ranging from 0.3 to 100 million Btus per hour. For propane, industrial boilers have a gross heat rate ranging from 10 to 100 million Btus per hour. Unit #7 is considered a small industrial boiler

EPA's AP-42, Chapter 1.5 for liquid petroleum gas combustion does not list an emission factor for hazardous air pollutants. Therefore, the Department considers the hazardous air pollutants from burning propane are negligible.

The emission factor for the combustion of diesel fuel was found in AP-42 Table 3.4-2, October 1996. The emission factor for the combustion of natural gas was derived from AP-42, Table 1.5

Table 6-1 provides a summary of hazardous air pollutant emissions based on Wharf's potential to emit.

Table 6-1 HAPs Emission Factors

Pollutant	Fuel	Emission Factor
HAPs	Natural Gas	1.89 lb/MMBtus
HAPs	Propane	n/a
	Diesel	0.0042 lb/MMBtus

Potential hazardous air pollutant emissions are derived using Equations 4.1 for Unit #7 and Equation 4.4 for the generators.

Table 6-1 –Potential Emissions for Hazardous Air Pollutants

Unit	Description	Potential Emissions (tons per year)
#7	Boiler	0.09
	Mercury Retort	0.0
	1989 Generator	0.02
	1988 Generator	0.007
	Total	**0.1 tons per year**

Wharf is considered an area source of hazardous air pollutants. DENR reviewed the Maximum Achievable Control Technology Standards under 40 CFR Part 63 and determined the following may be applicable to Wharf.

6.2 Stationary Reciprocating Internal Combustion Engines

40 CFR Part 63, Subpart ZZZZ establishes national emission and operating limitations for hazardous air pollutants emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of hazardous air pollutant emissions. A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. The two generators are considered stationary RICE engines and are subject to this subpart.

According to 40 CFR § 63.6590(a)(1)(iii), a stationary RICE at an area source is existing (and subject to this subpart) if it commenced construction or reconstruction of the stationary RICE before June 12, 2006. This subpart states construction is defined as the date the generator was ordered. Both generators commenced construction before June 12, 2006, and are considered existing stationary RICE.

Both generators are considered emergency generators. The 1988 Euclid generator is rated at 660 kilowatts or 884 horsepower with a displacement of 24 liters and 16 cylinders which equates to 1.5 liters per cylinder. The 1989 Cat generator is rated at 1,750 kilowatts or 2,344 horsepower with a displacement of 69 liters and 16 cylinders which equates to 4.3 liters per cylinder.

The generators are required to meet the requirements in this subpart applicable to an existing compression ignition generator at an area source of hazardous air pollutants with a site rating of more than 500 brake horsepower and a displacement of less than 10 liters per cylinder. Wharf must comply with the applicable emission and operating limits no later than May 3, 2013.

6.3 Industrial, Commercial, and Institutional Boilers and Process Heaters

40 CFR Part 63, Subpart DDDDD establishes national emission and operating limits for hazardous air pollutants emitted from industrial, commercial, and institutional boilers and process heaters located at a major source of hazardous air pollutant emissions. Wharf is considered an area source of hazardous air pollutants and not subject to this subpart.

6.4 Area Source for Industrial, Commercial and Institutional Boilers

On March 21, 2011, EPA finalized the MACT standard under 40 CFR Part 63, Subpart JJJJJJ. This rule applies to all new or existing industrial, commercial, and institutional boilers located at an area source of hazardous air pollutants. An existing boiler is defined as a boiler where construction or reconstruction occurred prior to June 4, 2010.

Wharf operates six natural gas or propane fired boilers that were all constructed prior to 2006. The potential hazardous air pollutant emissions from Wharf classify it as an area source of hazardous air pollutants.

In accordance with 40 CFR § 63.11195(e), a gas-fired boiler is exempt from the requirements of this subpart. A gas-fired boiler is defined as "…any boiler that burns gaseous fuels not combined with any solid fuels, burns liquid fuel only during periods of gas curtailment, gas supply emergencies, or periodic testing on liquid fuel." Gaseous fuels include natural gas. Therefore, Wharf is not subject to this subpart provided natural gas or propane is the only fuel burned in the boilers.

6.5 Gold Mine Ore Processing and Production Area Source Category

40 CFR Part 63 Subpart EEEEEEE is applicable to gold mine ore processing and production facilities. Gold mine ore process and production facility means any industrial facility engaged in the processing of gold mine ore. A gold mine ore processing and production facility is an existing facility if it was in operation on or before April 28, 2010. Wharf is considered an existing facility.

The affected sources include each collection of "ore pretreatment processes," "carbon processes with mercury retorts," "carbon processes without mercury retorts," and "non-carbon concentrate

processes" at a gold mine ore processing and production facility. Wharf's gold recovery process is a carbon process with mercury retorts.

Wharf's mercury emission limit is 2.2 pounds of mercury per ton of gold concentrate processed. Wharf conducted stack emissions testing of the mercury emitting sources in August 2011. Emission rates indicate that Wharf exceeds the stated emission rate. Wharf is subject to this subpart and has a compliance date of February 17, 2014 to comply with the applicable emission limit. The applicable requirements will be placed in the air quality permit.

6.6 Other MACT Standards

DENR reviewed the other Maximum Achievable Control Technology Standards and determined there are no other standards applicable to this ethanol plant.

7.0 State Requirements

7.1 State Particulate Emission Limits

ARSD 74:36:06:02(1) and 74:36:06:03(1), establish state emission limits for total suspended particulate matter. In addition, ARSD 74:36:12:01 establishes a visible emission limit of 20 percent opacity for each unit not subject to a New Source Performance Standard (Unit #5).

In accordance with ARSD 74:36:06:01, a unit that must comply with a total suspended particulate matter emission limit under the New Source Performance Standards, Maximum Achievable Control Technology Standards, the Acid Rain Program, or the Prevention of Significant Deterioration Program is exempt from having to meet the state's total suspended particulate matter emission limits. In this case, the tertiary crusher (Unit#5) is applicable to a New Source Performance Standard that has a particulate matter limit and is exempt from the state's total suspended particulate matter emission limit.

In accordance with ARSD 74:36:06:02(1)(a), a fuel burning unit with heat input value less than 10 million Btus per hour may not exceed 0.6 pounds of particulate emissions per million Btu of heat input. Based on the heat input capacities of the units that may be permitted, the small 660 kilowatt generator is applicable to this total suspended particulate matter emission limit.

In accordance with ARSD 74:36:06:02(1)(b), a fuel burning unit with a heat input equal to or greater than 10 million Btus per hour heat input may not exceed the particulate emissions rate determined by Equation 7-1.

Equation 7-1 – Particulate Emissions Limit for Fuel Burning Units

$$E_{TSP} = 0.811 \times H^{-0.131} =$$

Where:

- E_{TSP} = emission rate, in pounds per million Btu heat input, and
- H = heat input, in million Btus per hour.

Unit #7 has a heat input capacity greater than 10 million Btus per hour. Using the maximum heat input value for each unit and inputting this value into Equation 7-1 yields the corresponding state particulate emission limit shown in Table 7-1.

Using the emission factors found in Tables 4-1 and 4-3 provides a comparison of the potential emissions to the state emission limit to determine if the units are in compliance with the state emission limits as shown in Table 7-1.

Table 7-1 –Total Suspended Particulate Matter Emission Limit for Fuel Burning Units

Unit	Description	Maximum Heat Input	Potential Emission Rate	State Emission Limit
#7	Boiler #1	10.5 million Btus per hour	0.0006 pounds per million Btus	0.6 pounds per million Btus
	Generator	17.1 million Btus per hour	0.05 pounds per million Btus	0.56 pounds per million Btus
	Generator	660 Kw (2.25 million Btus per hour)	0.05 pounds per million Btus	0.6 pounds per million Btus

7.2 State Sulfur Dioxide Emission Limits

In accordance with ARSD 74:36:06:02(2) and ARSD 74:36:06:03(2), the permitted units may not emit sulfur dioxide emissions to the ambient air in an amount greater than three pounds of sulfur dioxide per million Btus of heat input. The sulfur dioxide emission limit is applicable to Unit #7 and the two generators.

7.3 Performance Tests

Wharf conducted performance testing in 1998, 2000, 2007, and 2011 to prove compliance with the New Source Performance Standard LL. Table 7-2 summarizes the applicable test results.

Table 7-2 – Comparison of Short Term Limits and Stack Test Results

Unit	Year	Pollutant	Limit (grams/dscm)	Stack Test Results (grams/dscm)	Percentage of Short Term Limit
#5	1998	PM	0.0123	0.05	24.6%
#5	2000	PM	0.014	0.05	28%
#5	2007	PM	0.0056	0.05	11.2%
#5	2011	Opacity	0 percent	7 percent	n/a

Based on the stack test results, DENR believes additional testing is not warranted to demonstrate compliance with this particulate emission limit.

7.4 Compliance Assurance Monitoring

Compliance assurance monitoring is applicable to any unit at major sources applying for a Title V air quality operating permit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with any such emission limit or standard; and
3. The unit has potential uncontrolled emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

Wharf Resources is a minor source required to obtain a Title V air quality permit because it is subject to New Source Performance Standards. Therefore, compliance assurance monitoring is not applicable.

7.5 Periodic Monitoring

Periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to the Title V air quality operating permit program. The permitted units at this facility are required to meet opacity, particulate matter, sulfur dioxide, and limits applicable to the New Source Performance Standards and Maximum Achievable Control Technology Standards. Periodic monitoring will be based on the following:

1. Periodic monitoring for opacity will be based on periodic visible emission readings or evaluations. Periodic monitoring of particulate matter emissions will consist of visible emission readings and proper operation and maintenance of all pollution control devices; and
2. Periodic monitoring of sulfur dioxide emissions for units burning natural gas is not required based on the sulfur content in pipeline quality natural gas.

The applicable limits in the New Source Performance Standards and Maximum Achievable Control Technology Standards will be based on the requirements in the applicable standard.

7.6 Air Fees

Sources subject to the Title V air quality operating permit program are subject to an annual air quality fee. The fee consists of an administrative fee and a per ton fee based on the actual tons per year of pollutant emitted. The pollutants charged for are particulate matter, sulfur dioxides, nitrogen oxides, volatile organic compounds, and hazardous air pollutants. The actual emissions are calculated by DENR based on operational information provided by the source.

8.0 Recommendation

Any source operating in South Dakota that meets the definition of a major source for any criteria pollutant is required to obtain a Title V air quality operating permit. A major source is defined as having the potential to emit greater than 100 tons per year of a criteria pollutant or greater than or equal to 10 tons per year of a single hazardous air pollutant, or greater than or equal to 25 tons

per year of a combination of hazardous air pollutants. In addition, sources subject to federal New Source Performance Standards or national emission standards for hazardous air pollutants must obtain a Title V air quality operating permit, unless otherwise noted in the state or federal rule.

Wharf is subject to New Source Performance Standards and Maximum Achievable Control Technology Standards. Therefore, Wharf is required to obtain a Title V air quality operating permit.

Based on the above findings, Wharf is required to operate within the requirements stipulated in the following regulations:

1. ARSD 74:36:05 – Operating Permits for Part 70 Sources;
2. ARSD 74:36:06 – Regulated Air Pollutant Emissions;
3. ARSD 74:36:07 – New Source Performance Standards;
4. ARSD 74:36:08 – National Emission Standards for Hazardous Air Pollutants;
5. ARSD 74:36:11 – Stack Performance Testing; and
6. ARSD 74:36:12 – Control of Visible Emissions.

Based on the information submitted in the air quality permit application, DENR recommends conditional approval to renew Wharf's Title V air quality operating permit. Any questions pertaining to this permit recommendation should be directed to Keith Gestring, Engineer II.